

MATHEMATICS

Find the Academic Content Standards for this subject area at:

http://www.doe.in.gov/standards/grade_te.html

Curriculum Resource Framework for this subject area at:

<http://www.indianastandardsresources.org>

Teacher Requirements for this subject area at:

<http://doe.in.gov/dps/licensing/assignmentcode>

ADVANCED MATHEMATICS, COLLEGE CREDIT

2544

(ADV MTH CC)

Advanced Mathematics, College Credit is a title covering (1) any advanced mathematics course offered for credit by an accredited postsecondary institution through an adjunct agreement with a secondary school or (2) any other postsecondary mathematics course offered for dual credit under the provisions of 511 IAC 6-10.

- Recommended Prerequisite: Algebra II and Geometry or Integrated Mathematics III
- Credits: A two credit course
- Counts as a Mathematics Course for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence or Flex Credit course

ALGEBRA I

2520

(ALG I)

Algebra I provides a formal development of the algebraic skills and concepts necessary for students to succeed in advanced courses. In particular, the instructional program in this course provides for the use of algebraic skills in a wide range of problem-solving situations. The concept of function is emphasized throughout the course. Topics include: (1) operations with real numbers, (2) linear equations and inequalities, (3) relations and functions, (4) polynomials, (5) algebraic fractions, and (6) nonlinear equations.

- Credits: A two credit course
- Fulfills the Algebra I/Integrated Mathematics I requirement for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence or Flex Credit course

ALGEBRA II

2522

(ALG II)

Algebra II is a course that extends the content of Algebra I and provides further development of the concept of a function. Topics include: (1) relations, functions, equations and inequalities; (2) conic sections; (3) polynomials; (4) algebraic fractions; (5) logarithmic and exponential functions; (6) sequences and series; and (7) counting principles and probability.

- Recommended Prerequisite: Algebra I

- Credits: A two credit course
- Fulfills the Algebra II/Integrated Mathematics III requirement for the Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas and counts as a Mathematics Course for the General Diploma
- A Career Academic Sequence or Flex Credit course

CALCULUS AB, ADVANCED PLACEMENT (CALC AB AP)

2562

Calculus AB, Advanced Placement is a course that provides students with the content established by the College Board. Topics include: (1) functions, graphs, and limits: analysis of graphs, limits of functions, asymptotic and unbounded behavior, continuity as a property of functions (2) derivatives: concepts of the derivative, derivative at a point, derivative as a function, second derivatives, application and computation of derivatives, and (3) integrals: interpretations and properties of definite integrals, applications of integrals, fundamental theorem of calculus, techniques of antidifferentiation, and numerical approximations to definite integrals. The use of graphing technology is required. A comprehensive description of this course can be found on the College Board AP Central Course Description web page at:

<http://apcentral.collegeboard.com/apc/public/courses/descriptions/index.html>

- Recommended Grade Level: Grades 11 or 12
- Recommended Prerequisite: Pre-Calculus
- Credits: A two credit course
- Counts as a Mathematics Course for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence or Flex Credit course

CALCULUS BC, ADVANCED PLACEMENT (CALC BC AP)

2572

Calculus BC, Advanced Placement is a course that provides students with the content established by the College Board. Topics include: (1) functions, graphs, and limits: analysis of graphs, limits of functions, asymptotic and unbounded behavior, continuity as a property of functions, and parametric, polar, and vector functions (2) derivatives: concept of the derivative, derivative at a point, derivative as a function, second derivatives, applications of derivatives and computation of derivatives, (3) integrals: interpretations and properties of definite integrals, applications of integrals, fundamental theorem of calculus, techniques and applications of antidifferentiation, and numerical approximations to definite integrals, and (4) polynomial approximations and series: concept of series, series of constants, and Taylor series. The use of graphing technology is required. A comprehensive description of this course can be found on the College Board AP Central Course Description web page at:

<http://apcentral.collegeboard.com/apc/public/courses/descriptions/index.html>

- Recommended Grade Level: Grades 11 or 12
- Recommended Prerequisite: Pre-Calculus
- Credits: A two credit course
- Counts as a Mathematics Course for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence or Flex Credit course

DISCRETE MATHEMATICS
(DISCRETE)

2530

Discrete Mathematics is an umbrella of mathematical topics. It is a course designed for students who will undertake higher-level mathematics in college that may not include calculus. Topics include: (1) counting techniques, (2) matrices, (3) recursion, (4) graph theory, (5) social choice, (6) linear programming, and (7) game theory. Technology, such as computers and graphing calculators, should be used frequently.

- Recommended Prerequisite: Algebra II or Integrated Mathematics III
- Credits: A one or two credit course based on Indiana's Academic Standards for Discrete Mathematics (A one-credit Discrete Mathematics course includes counting techniques, matrices, and recursion with other topics included as time allows.)
- Counts as a Mathematics Course for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence or Flex Credit course

FURTHER MATHEMATICS STANDARD LEVEL, INTERNATIONAL BACCALAUREATE
(FMATH S IB)

2580

Further Mathematics Standard Level, International Baccalaureate includes geometry topic and four Mathematics Higher Level option topics: statistics and probability; sets, relations and groups; series and differential equations; and discrete mathematics.

- Recommended Grade Level: Grades 11 and 12
- Recommended prerequisites: students will have studied one of the four option topics from Mathematics Higher Level
- Credits: 2 semester course, 1 credit per semester
- Counts as a junior or senior Mathematics Course for the Core 40, Core 40 with Academic Honors, Core 40 with Technical Honors and International Baccalaureate diplomas or as an Elective for any diploma
- A Career Academic Sequence or Flex Credit course

GEOMETRY
(GEOM)

2532

Geometry students examine the properties of two- and three-dimensional objects. Proof and logic, as well as investigative strategies in drawing conclusions, are stressed. Properties and relationships of geometric objects include the study of: (1) points, lines, angles and planes; (2) polygons, with a special focus on quadrilaterals, triangles, right triangles; (3) circles; and (4) polyhedra and other solids. Use of graphing calculators and computer drawing programs is encouraged.

- Recommended Prerequisite: Algebra I
- Credits: A two credit course
- Fulfills the Geometry/Integrated Mathematics II requirement for the Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas and counts as a Mathematics Course for the General Diploma
- A Career Academic Sequence or Flex Credit course

INTEGRATED MATHEMATICS I

2554

(INT MATH I)

Integrated Mathematics I provides a formal development of the skills and concepts necessary for students to succeed in advanced courses. In particular, the instructional program in this course provides for the use of skills in a wide range of problem-solving situations. Topics include: (1) algebra and functions, (2) geometry and measurement, (3) data analysis and statistics, (4) probability, (5) discrete mathematics, and (6) trigonometry.

- Credits: A two credit course
- Fulfills the Algebra I/Integrated Mathematics I requirement for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence or Flex Credit course

INTEGRATED MATHEMATICS II

2556

(INT MATH II)

Integrated Mathematics II is a course that expands on the topics of Integrated Mathematics I. The instructional program in this course provides for the use of skills in a wide range of problem-solving situations. Topics include: (1) algebra and functions, (2) geometry and measurement, (3) data analysis and statistics, (4) probability, (5) discrete mathematics, and (6) trigonometry.

- Recommended Prerequisite: Integrated Mathematics I
- Credits: A two credit course
- Fulfills the Geometry/Integrated Mathematics II requirement for the Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas and counts as a Mathematics Course for the General Diploma
- A Career Academic Sequence or Flex Credit course

INTEGRATED MATHEMATICS III

2558

(INT MATH III)

Integrated Mathematics III is a course that expands on the topics of Integrated Mathematics II. The instructional program in this course provides for the use of skills in a wide range of problem-solving situations. Topics include: (1) number sense and computation, (2) algebra and functions, (3) geometry and measurement, (4) data analysis and statistics, (5) probability, and (6) discrete mathematics.

- Recommended Prerequisite: Integrated Mathematics II
- Credits: A two credit course
- Fulfills the Algebra II/Integrated Mathematics III requirement for the Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas and counts as a Mathematics Course for the General Diploma
- A Career Academic Sequence or Flex Credit course

INVESTIGATIVE GEOMETRY

2534

(INVEST GEOM)

Investigative Geometry provides the mathematical background, skills, and thinking processes necessary for the successful completion of Geometry. Emphasis is on an investigative study of basic properties of lines, angles, triangles, polygons, and circles as well as spatial relationships,

inductive reasoning, and logical thinking. Drawing and interpreting planar and spatial phenomena, transformations, and geometric problem solving are also included. Use of graphing calculators and computer drawing programs is encouraged.

- Recommended Prerequisite: Algebra I
- Credits: A two credit course
- Counts as a Mathematics Course for the General Diploma only and as an Elective for the Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence or Flex Credit course

MATHEMATICAL STUDIES STANDARD LEVEL, INTERNATIONAL BACCALAUREATE
2586 (MA ST S IB)

Mathematical Studies Standard Level, International Baccalaureate includes eight core topics: introduction to the graphic display calculator, number and algebra, sets, logic and probability, functions, geometry and trigonometry, statistics, introductory differential calculus, and financial mathematics.

- Recommended Grade Level: Grades 11 and 12
- Recommended prerequisites: students should have a good understanding of basic arithmetic, algebra, geometry, and trigonometry.
- Credits: 2 semester course, 1 credit per semester
- Counts as a junior or senior Mathematics Course for the Core 40, Core 40 with Academic Honors, Core 40 with Technical Honors and International Baccalaureate diplomas or as an Elective for any diploma
- A Career Academic Sequence or Flex Credit course

MATHEMATICS HIGHER LEVEL, INTERNATIONAL BACCALAUREATE
2582 (MATH H IB)

Mathematics Higher Level, International Baccalaureate includes seven core topics: algebra, functions and equations, circular functions and trigonometry, matrices, vectors, statistics and probability, and calculus. In addition, students also must complete one of the following four options: statistics and probability, sets, relations and groups, series and differential equations, or discrete mathematics.

- Recommended Grade Level: Grades 11 and 12
- Recommended prerequisites: students should have a strong understanding of arithmetic, algebra, geometry, trigonometry and statistics.
- Credits: 4 semester course, 1 credit per semester
- Counts as a junior or senior year Mathematics Course as required for Core 40, Core 40 with Academic Honors, Core 40 with Technical Honors and International Baccalaureate diplomas or as an Elective for any diploma
- A Career Academic Sequence or Flex Credit course

MATHEMATICS LAB
2560 (MATH LAB)

Mathematics Lab provides students with individualized instruction designed to support success in completing mathematics coursework aligned with *Indiana's Academic Standards for Mathematics*.

- Credits: A one to eight credit elective course
- Counts as an Elective for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence or Flex Credit course

MATHEMATICS STANDARD LEVEL, INTERNATIONAL BACCALAUREATE

2584

(MATH S IB)

Mathematics Standard Level, International Baccalaureate includes seven core topics: algebra, functions and equations, circular functions and trigonometry, matrices, vectors, statistics and probability, and calculus.

- Recommended Grade Level: Grades 11 and 12
- Recommended prerequisites: students should have a good understanding of arithmetic, algebra, geometry, trigonometry, and statistics.
- Credits: 2 semester course, 1 credit per semester
- Counts as a junior or senior Mathematics Course for the Core 40, Core 40 with Academic Honors, Core 40 with Technical Honors and International Baccalaureate diplomas or as an Elective for any diploma
- A Career Academic Sequence or Flex Credit course

PRE-ALGEBRA

2508

(PRE-ALG)

Pre-Algebra provides the mathematical background, skills, and thinking processes necessary for the successful completion of Algebra. Topics include: (1) number sense and computation, (2) algebra and functions, (3) geometry, (4) measurement, (5) data analysis, and (6) probability. The instructional program of this course addresses both the understanding and use of the concepts in appropriate problem-solving situations.

- Credits: A two credit course
- Counts as a Mathematics Course for the General Diploma only or as an Elective for the Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence or Flex Credit course

PRE-CALCULUS/TRIGONOMETRY

2564

(PRECAL/TRIG)

Pre-Calculus/Trigonometry blends the concepts and skills that must be mastered before enrollment in a college-level calculus course. The course includes the study of (1) relations and functions, (2) exponential and logarithmic functions, (3) trigonometry in triangles, (4) trigonometric functions, (5) trigonometric identities and equations, (6) polar coordinates and complex numbers, (7) sequences and series and (8) data analysis.

PRE-CALCULUS (2568) includes the study of (1) relations and functions, (2) exponential and logarithmic functions, (3) sequences and series, and (4) data analysis.

TRIGONOMETRY (2566) includes the study of (1) trigonometry in triangles, (2) trigonometric functions, (3) trigonometric identities and equations, and (4) polar coordinates and complex numbers.

- Recommended Prerequisite: Algebra II and Geometry or Integrated Mathematics III
- Credits: A two credit course (Pre-Calculus may be divided into a one-credit Pre-Calculus course and a one-credit Trigonometry course)
- Counts as a Mathematics Course for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence or Flex Credit course

PROBABILITY AND STATISTICS (PROB/STAT)

2546

Probability and Statistics includes the concepts and skills needed to apply statistical techniques in the decision-making process. Topics include: (1) descriptive statistics, (2) probability, and (3) statistical inference. Practical examples based on real experimental data are used throughout. Students plan and conduct experiments or surveys and analyze the resulting data. The use of graphing calculators and computer programs is encouraged.

- Recommended Prerequisite: Algebra II or Integrated Mathematics III
- Credits: A one credit course
- Counts as a Mathematics Course for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence or Flex Credit course

STATISTICS, ADVANCED PLACEMENT (STAT AP)

2570

Statistics, Advanced Placement is a course based on content established by the College Board. The purpose of the AP course in statistics is to introduce students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. Topics include: (1) exploring data: describing patterns and departures from patterns (2) sampling and experimentation: planning and conducting a study, (3) anticipating patterns: exploring random phenomena using probability and simulation, and (4) statistical inference: estimating population parameters and testing hypotheses. The use of graphing calculators and computer software is required. A comprehensive description of this course can be found on the College Board AP Central Course Description web page at:

<http://apcentral.collegeboard.com/apc/public/courses/descriptions/index.html>

- Recommended Grade Level: Grades 11 or 12
- Recommended Prerequisite: Algebra II or Integrated Mathematics III
- Credits: A two credit course
- Counts as a Mathematics Course for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence or Flex Credit course